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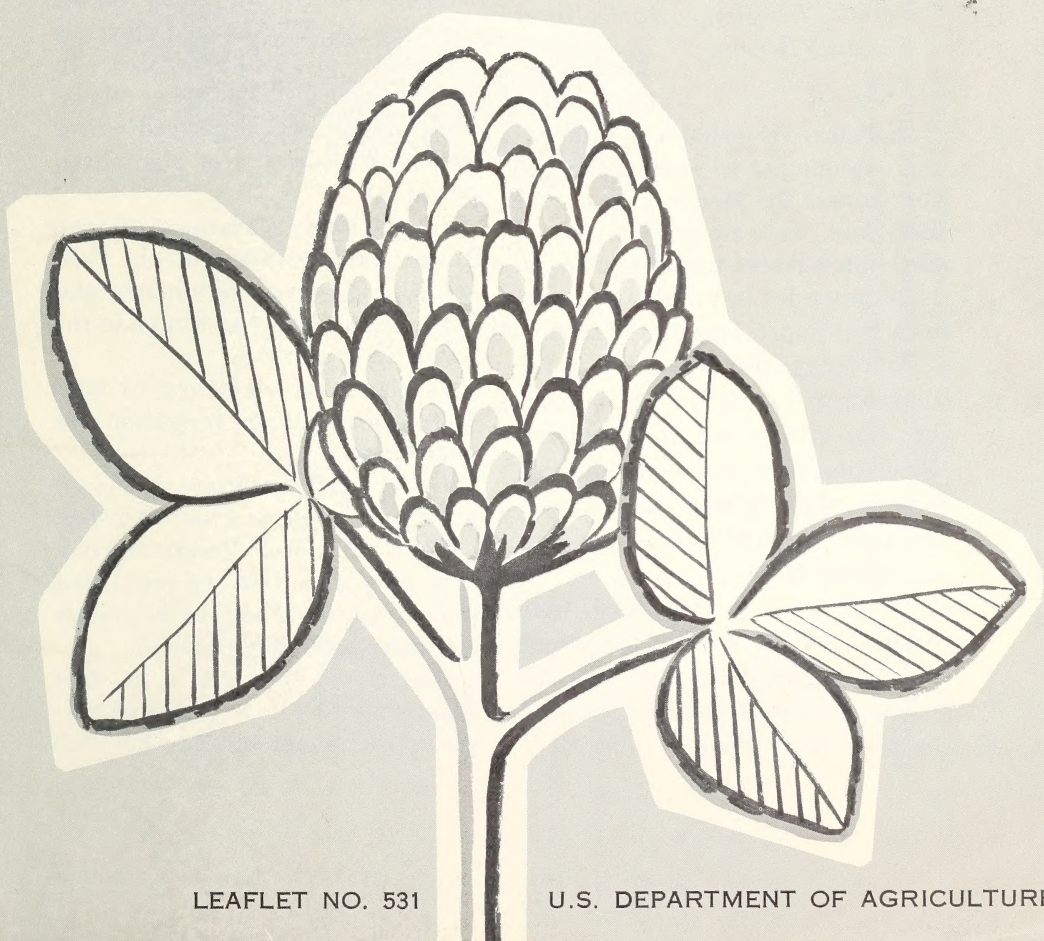
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GROWING RED CLOVER

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Growing Red Clover

Information for this publication was furnished by the Crops Research Division, Agricultural Research Service

Red clover is a short-lived perennial legume native to the countries that border the Mediterranean and Red Seas. It is adapted to most of the United States, including Alaska. It is grown for hay and silage, pasture, soil improvement, and seed.

As a forage crop it is excellent for livestock and poultry. In comparison with alfalfa, red clover hay has about two-thirds as much digestible protein, slightly more total digestible nutrients, and a slightly higher net energy value.

It will grow in any moist, well-drained soil that is not too sandy. A good soil for red clover is one that produces a good yield of corn, tobacco, or small grain.

WHERE AND HOW IT GROWS

The accompanying map shows the three zones where red clover is adapted to the United States. In zone 1, and in the higher elevations of zones 2 and 3, red clover grows as a biennial or short-lived perennial.

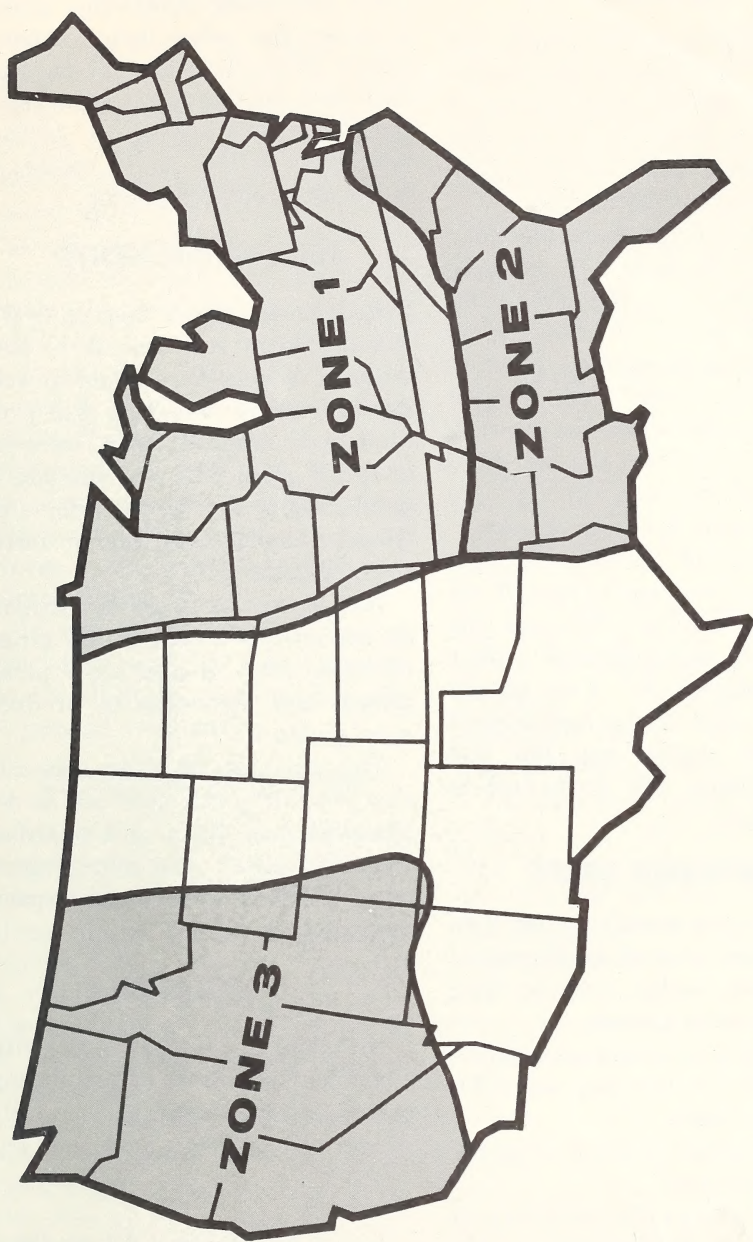
In the lower elevations of zone 2, it grows as a winter annual. Fall-seeded red clover germinates and exists throughout the winter in the form of a low rosette.

In the lower elevations of zone 3, it grows (under irrigation) as a biennial.

Under ideal conditions, the plant grows to a height of about 30 inches.

Most red clover flowers are reddish purple; a few are rose, lilac, pink, or white. They are self-sterile and must be cross-pollinated.

Red clover seed varies in color from almost white to yellow to purple. It is about one-twelfth inch



The three zones where red clover is adapted to the United States. In zone 1, and in the higher elevations of zones 2 and 3, red clover grows as a short-lived

perennial. In the lower elevations of zone 2, it grows as a winter annual. In the lower elevations of zone 3, it grows (under irrigation) as a biennial.

long, and resembles a mitten in shape.

VARIETIES

The varieties of red clover are generally of two types—early-flowering varieties that produce at least two cuttings per season, and late-flowering varieties that produce one cutting per season.

Early-flowering varieties—they are called “medium” or “double-cut” varieties—are the most common type grown in the United States. Late-flowering varieties (called “mammoth” or “single-cut”) are grown where the growing season is short—in the northern latitudes of zone 1, in the high elevations of zone 3, and in Alaska.

A number of varieties of both medium and mammoth types of red clover are available. However, the varieties are rather limited in their areas of adaptation. Your county agent or your State agricultural experiment station can tell you which varieties will grow best in your locality.

COMPANION CROPS

Red clover is usually grown with a companion crop of small grain—oats, wheat, barley, rye—or with timothy or other grasses.

Companion crops always compete with the clover, but they also offer these advantages:

- They permit a return from the land the first year.
- They tend to prevent a crop of weeds from developing in the clover.
- They retard erosion before the clover is established.

• They reduce freezing injury to the clover seedlings.

If you decide to plant a small grain as a companion crop, select a variety that offers little competition to the clover—one that matures early and has short straws and comparatively few leaves. A variety that often lodges is, of course, a hazardous companion crop.

SOIL REQUIREMENTS

Red clover grows best on well-drained loam soil, but it is also adapted to soils that are not so well drained. Most soils that will produce good crops of corn, tobacco, or small grain will also produce a good crop of red clover. Some of these soils will need lime or fertilizer, or both.

Red clover is most productive on soil that is within a pH range of 6.6 to 7.6.¹ It also needs phosphorus and potassium to produce good yields.

The amounts of these elements that your field will need can be determined best by a soil analysis. For help, consult your county agent or your State agricultural experiment station.

INOCULATION

Inoculate red clover seed with a commercial culture of nodulating bacteria before sowing, especially if you are planting land that has

¹ For an explanation of pH, see Farmers' Bulletin 2124, "Liming Soils: An Aid to Better Farming"; available from U.S. Department of Agriculture, Washington, D.C., 20250.

not grown red clover for a number of years.

CLOVER SEEDING

In zone 1 and the higher elevations of zones 2 and 3, most red clover is spring seeded in a crop of fall- or spring-sown small grain. In the early spring the soil alternately freezes and thaws, and the freezing and thawing action covers the seed with soil. The small grain holds the weed growth in check while the clover is getting started.

In the lower elevations of zones 2 and 3, make red clover seedings about October 15. In any event, make them no later than December 15. In these areas—particularly in the lower elevations of zone 3—red clover is frequently sown without a companion crop.

In zone 2, late-summer seedings can be successful if they are made on a seedbed that has been fallowed to prevent weed growth.

CLOVER-GRASS SEEDING

In zone 1, grass is extensively seeded with red clover. Clover-grass mixtures are superior to clover alone. Clover-grass hay cures more rapidly than pure clover hay, and it produces more hay per acre. Also, animals are less likely to bloat on clover-grass pasture than on pure clover.

Timothy is the best grass to mix with red clover. It has a high yield, and it is ready to cut for hay when the red clover is ready.

Sow the grass in the early fall in the small-grain crop; sow the red clover in the small grain-grass in the spring.

When you harvest the grain crop, remove the straw and stubble from the field. Straw and stubble of harvested small grain will smother the clover and favor clover disease development. Clover-hay yields from fields where the straw and stubble have been left are only about one-half as large as the yields from fields from which both the straw and stubble have been removed immediately after combining.

STAND MANAGEMENT

First Year

Small-grain companion crops compete with red clover for mineral nutrients, moisture, and light. This competition can be reduced by grazing or clipping the small grain in late winter or early spring—just before its stems begin to grow. (Grazing or clipping after the stems have begun to joint will reduce the small-grain yield.)

The first year, graze or mow the clover 4 to 6 weeks before the first frost in the fall. For example, if your average first frost date is October 20, graze or clip the red clover about September 1.

If you mow your stand of red clover, remove the clippings unless the total amount is quite small.

Second Year

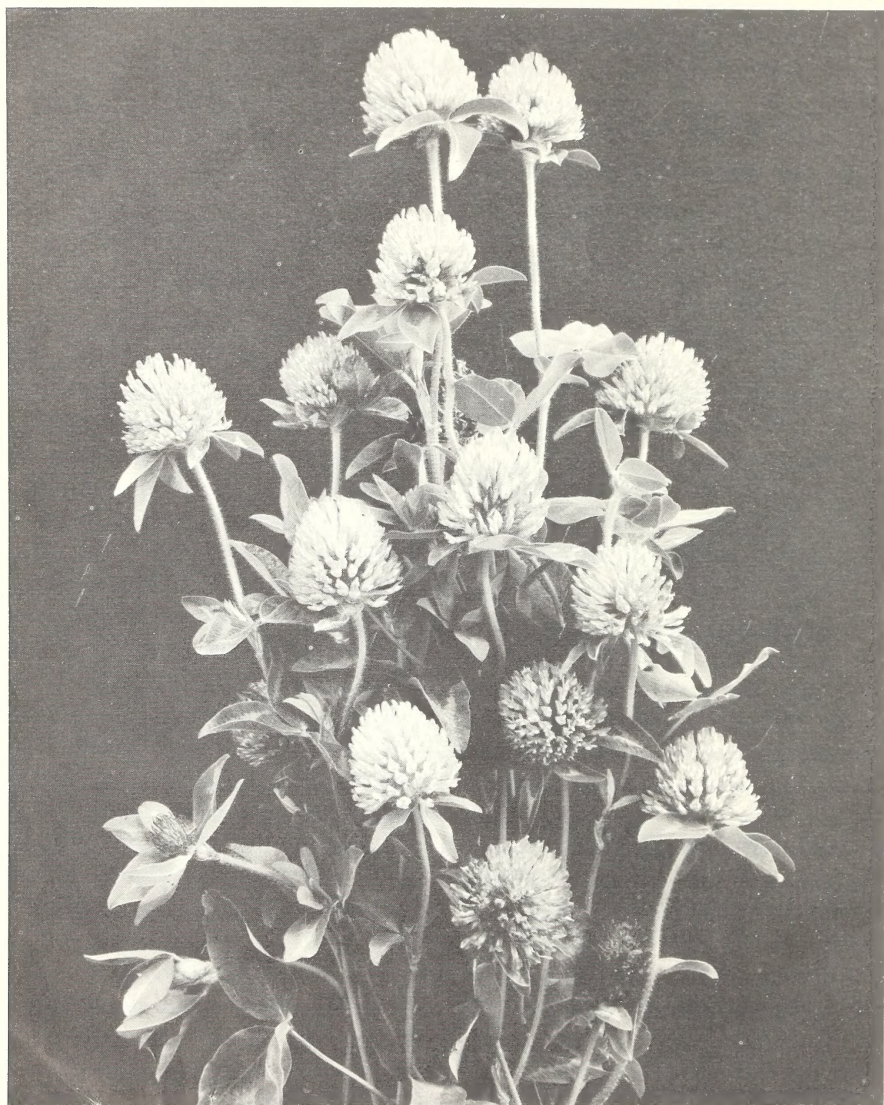
The first crop of red clover, harvested early the second year, is almost always harvested for hay or silage. Cut it in early bloom; at that stage of maturity, red clover is leafy and produces its largest yield of protein per acre. If you cut it

later than early bloom, you will cut the immature second growth—this weakens the plants, and the stand is likely to become quite poor by the end of summer.

Cut red clover about 15 days after

the very first bloom has appeared in the stand. If you grow grass with your clover, cut the stand when the clover is ready rather than when the grass is ready.

Usually the second crop of red



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Red clover in full bloom. Red clover should be cut for hay before it reaches this stage.

clover is pastured, harvested for seed, or grown for soil improvement only. If it is harvested for hay, it should be cut in early bloom; however, hay made from this crop is occasionally unpalatable to cattle and sheep.

USES

Hay and Silage

A stand of medium red clover will produce two or three crops of hay the harvest year. Mammoth clover will produce one crop.

Stem crushing—to condition the hay after mowing—decreases the curing time and improves the quality of the hay.

After the crop is cut, allow it to wilt in the swath and then rake it into small, loose windrows. It will cure about as rapidly in the windrows as in the swath, and fewer leaves will be lost in baling.

You can also force-air dry red clover hay. Forced-air drying is better than windrow drying. It preserves the green color, lessens leaf shattering, and practically eliminates spoilage.

Red clover and red clover-grass mixtures are frequently ensiled. These crops make good silage if they are wilted slightly before they are ensiled, or if carbohydrate or chemical preservatives are added to them as they are ensiled.

Pasture

Red clover is one of the best legume pasture plants for livestock and poultry. Red clover and red clover-grass mixture pastures can be grazed or they can be cut green and fed to livestock and poultry.

Red clover is also one of the better legumes for renovating old pastures. Clip or graze the old pasture closely. Chop up the sod with a disk or harrow before sowing the red clover seed.

Soil Improvement

In addition to its principal value as livestock feed, a red clover crop turned under as green manure improves the physical properties of the soil and increases the yield of the following cultivated crop.

There are many crop rotations in which red clover plays a part. One of the oldest is the 3-year rotation of corn, oats or wheat, and red clover. Other common rotations are:

- Corn, soybeans, small grain, red clover.
- Corn, corn, small grain, red clover.
- Rice, red clover.
- Sugar beets, small grain, red clover.
- Tobacco, rye or wheat, red clover-grass, grass, grass.
- Potatoes, small grain, red clover.

DISEASES

Many organisms produce diseases in red clover. Foliage diseases are the most conspicuous, but usually they are not as destructive as root and crown diseases.

Root-knot nematodes also infest red clover. Nematodes cause swellings on the roots; the swellings resemble the nodules produced by the inoculating-culture bacteria.

The best disease control is good stand management:

- Plant adapted, disease-resistant varieties.

- Lime and fertilize the soil for vigorous stand growth.

- Cut the stand at the proper time.

Nematodes, and some of the root and crown rots, can be controlled fairly effectively by crop rotation.

SEED PRODUCTION

While the first crop of the second-year stand is usually harvested for hay or silage, the second crop may be harvested for seed.

In most areas, it is necessary to pollinate with honey bees. Two to three strong colonies of bees per acre are usually sufficient.

The best seed yields occur when there is an abundance of bees, when soil fertility and moisture are adequate to promote good growth, and when the weather is warm and clear during the flowering period. Cloudy, rainy weather for prolonged periods, or lack of soil fertility and moisture reduces flowering and retards bee visits.

Harvest the seed crop when the greatest number of the seed heads are brown, usually 25 to 30 days after full bloom.

Cut the seed crop with a mower. Let it cure in the swath or in small windrows. During showery weath-

er, the mowed crop cures better in swaths than in windrows. Windrowing is better during clear, warm weather because it reduces harvesting losses. Handle the cut crop as little as possible; each handling causes shattering losses.

Harvest the swathed or windrowed crops with a combine equipped with a pickup attachment. Operate the combine carefully to do a good harvesting job and to reduce harvesting losses. Travel at the correct rate of forward speed and properly adjust the cylinder clearance, the cylinder speed, and the air blast. For instructions, see your operator's manual.

Seed harvested during periods of high humidity or after showers may contain too much moisture or parts of leaves and stems for safe storage.

Artificial drying or drying by spreading the seed thinly on a floor may improve the quality of the seed.

When the seed is spread thinly on a floor, it should be turned every few days until it is completely dry. Rough cleaning immediately after combining reduces the drying time and improves seed quality.

Defoliating the red clover with chemicals is usually ineffective. It can be detrimental if the weather does not remain sunny and dry from the time the chemical is applied until the seed is combined.

